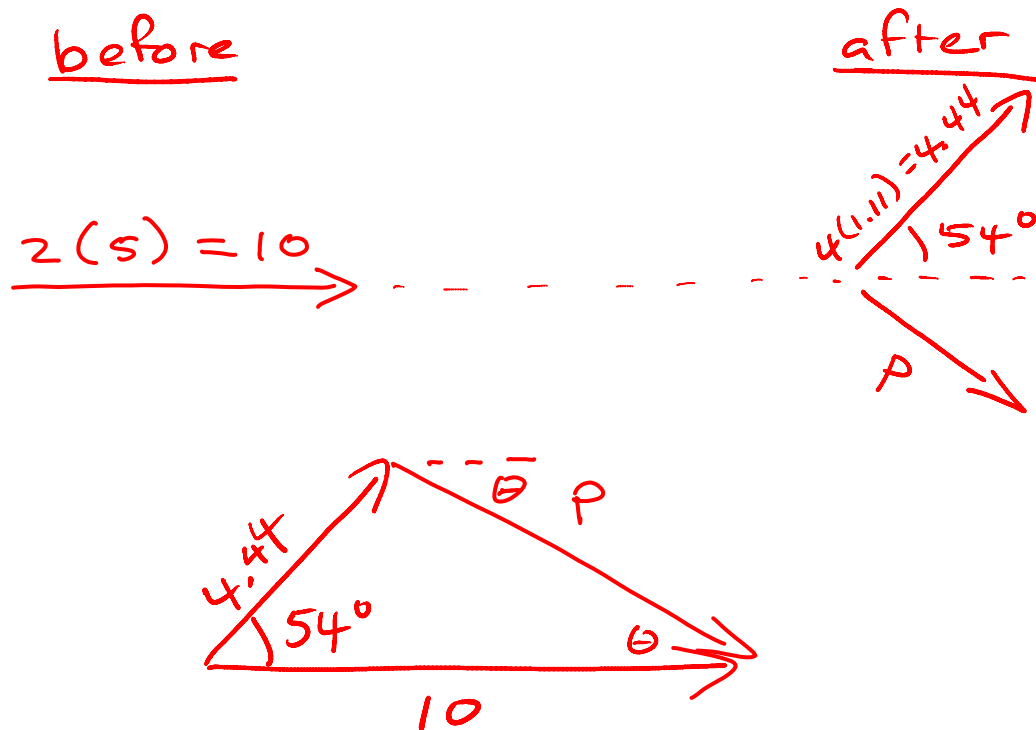


**Example #16:** A 2.0 kg ball going 5.0 m/s strikes a stationary 4.0 kg ball. After the collision, the second ball goes off at 1.11 m/s at  $54^\circ$  from the direction of the original ball. What is the speed and direction of the first ball?

→ since no orientation is given, choose a simple direction for the first moving ball:



$$p^2 = 10^2 + 4.44^2 - 2(10)(4.44)\cos 54$$

$$p = 8.22 \frac{\text{kg} \cdot \text{m}}{\text{s}}$$

$$p = mv \quad 8.22 = 2v \quad v = 4.1 \text{ m/s}$$

$$\frac{\sin 54}{8.28} = \frac{\sin \theta}{4.44} \quad \theta = 26^\circ$$

$$\Rightarrow \boxed{v = 4.1 \text{ m/s @ } 26^\circ \text{ from original path}}$$